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other forces; but even that would tell us neither anything of the intimate nature of thought, nor at all explain the peculiarities of its laws.

"How an impression upon the periphery of a nerve becomes transformed into a *sensation*, is, as Professor Huxley remarks, 'utterly unknown to us.' Still less is it known what nature of process is that by which sensations, variously grouped and recalled by external chances, produce an *emotion*. Incomparably more obscure is the character of self-conscious intellection. Regarded as the result of chemical action, equal quantities of this action produce results as different as 'Tam O'Shanter' and a tedious street song, or as Newton's generalization of the law of gravity and a jockey's successful horse trade. A wholly different measure of value must therefore be applied to thought from that applied to other forces. No imaginable quantity or quality of heat and phosphorus guarantees a *true* idea, and not a false one; for this characteristic that we call *truth* is the only test of the energy of an idea, be it in the shape of a poem, a drama, or a hypothesis.

"It is well known, too, that the laws of right thinking, though well ascertained, are yet merely *purposive*, and not necessary or authoritative, as are the laws of all other forms of force concerned in brain action. Hence a science of thought in the ordinary sense of the term, that is, based on an induction of facts, becomes, and is, wholly impossible. The laws of thought are more honored in the breach than in the observance, yet their actuality cannot be questioned. Hence, again, brain action gives rise to, or leads to a sense of the presence of, a force different in quality as well as quantity from any other known to us.

"There is not the faintest reason to suppose that this force (to call conscious thought by that name) is produced or aroused *only* by cerebra-action. Not a tittle of evidence in this direction has ever been adduced; and if the contrary is not known either, the prudent writer will avoid committing himself positively."

Natural Law.

In the *Medical and Surgical Reporter* for Nov. 28th, 1874, Dr. Brinton discusses Professor Wharton's work on "Negligence." Speaking of Wharton's criticism on Mill's definition of Natural Law, he says:

"Law, then, be it observed, has two entirely different meanings. The one is that which is intended in juridical and moral law. Here the essence of law is *conscious obligation*, due to a command or precept laid down by a governing power.

"No such signification attaches to natural laws as those defined by the physical sciences. Nothing in the nature of conscious obligation can be supposed to exist in matter. Yet this obvious distinction is entirely overlooked by Mr. Wharton, and often has been neglected by theological and forensic writers before him.

"What, then, is a natural law? Mr. Wharton very justly attacks the definition given by Mill, that it is 'the sum of all the antecedents of an event'; or, to put it in other words, that it can be reduced merely to 'uniformity of sequence.' This is the view of most physicists. It is defended by Professor Bain, by Tyndall, by Huxley, and by all the materialistic school of thinkers. They say that experience is the only teacher we have, and that long-continued, unbroken experience of a consequent uniformly following an antecedent is and must be the highest proof of a natural law.

"The statement is plausible, but fallacious. Not fallacious, however, on the grounds which Mr. Wharton defends, namely, that cause implies a Will capable of making and breaking a law. No such thing. Several weeks ago we discussed this question of a Will, and pointed out, that truth in its highest forms admits of no such notion.

"That there is a higher warrant for natural law than uniformity of sequence, than mere experience, comes from the nature of reason itself, and is capable of demonstration.

"A few examples will serve to show the difference between the empirical law—the result of observed sequences—and the theoretical necessity which is at the foundation of every real law of nature. The planetary motions were first correctly stated by Kepler, who derived them from the astronomical observations of Tycho de Brahe; but, though Kepler accurately laid down the law of these motions on experimental grounds, it was reserved for the intellect of Sir Isaac Newton to give these observations their true significance by demonstrating the force of gravity, by virtue of which the planetary motions are inevitable effects. On the other hand, we know by daily experience that sensations are consequent upon impressions on the nervous peripheries; but the law of this sequence remains the desideratum of psychology.

"A real law finds its absolute confirmation in the fact that it transcends experience; that no observation attests the full amount of validity which we know it to possess. Reason alone is its sanction, and not experience; on the contrary, experience rarely comes up to the demands of the law. Thus, no hand of man has ever drawn an absolutely perfect circle; imagination cannot picture one; yet we have many propositions, or laws of relation, about circles which have in them no mixture of error. The actual velocity of a falling body is in no instance directly as the mass and inversely as the square of the distance; but this very fact becomes the proof of the law, for, allowance made for retardations, the theoretical accuracy of the law is vindicated.

"The essence of every real law of nature is its *theoretical necessity*. Expressed in terms of thought, this is the *ens rationis*. Hence, the definition of Mill and Bain must be condemned as incomplete; that advocated by Wharton, who considers natural law an expression of the will of God, must (if that expression is used as in any way corresponding to human volition) be rejected as contrary to the very nature of law; and, in any case, the confusion of the three meanings of law, to-wit, conscious obligation, observed sequence, and theoretical necessity, should always be avoided by writers on jurisprudence, theology, or physics."

Cortical Brain Substance.

Dr. Brinton continues his psychological discussions in his journal for December 12, 1874, in the following remarks upon the "Cortical Brain Substance":